

CLAIMS

What is claimed is:

1. A relay device for a Radio Frequency IDentification (RFID) transponder, comprising:

a first antenna;

a second antenna;

a transmission line coupling said first antenna and said second antenna; and

an impedance adjusting circuit coupled to said transmission line and configured for coupling to the RFID transponder.

2. The relay device for the RFID transponder of claim 1, wherein the RFID device is attached to a container.

3. The relay device for the RFID transponder of claim 2, wherein said container is formed of folded fiberboard parts.

4. The relay device for the RFID transponder of claim 2, wherein said container is a pallet.

5. The relay device for the RFID transponder of claim 2, wherein said first antenna is positioned at a first location on said container and said second antenna is positioned at a second location on said container other than said first location.

6. The relay device for the RFID transponder of claim 1, further comprising a third antenna coupled to said transmission line.

7. The relay device for the RFID transponder of claim 1, further comprising a second transmission line coupling a third antenna and a fourth antenna.

8. The relay device for the RFID transponder of claim 1, wherein at least one of said first antenna and said second antenna is a dipole antenna.

9. The relay device for the RFID transponder of claim 1, wherein at least one of said first antenna and said second antenna is a loop antenna.

10. The relay device for the RFID transponder of claim 1, wherein at least one of said first antenna and said second antenna is a spiral antenna.

11. The relay device for the RFID transponder of claim 1, wherein said transmission line is a common resonant structure that is also configured to form at least one of said first antenna and said second antenna.

12. The relay device for the RFID transponder of claim 2, wherein said container comprises:

a first wall;

a second wall; and

a rib interconnecting said first wall and said second wall.

13. The relay device for the RFID transponder of claim 12, wherein said transmission line is interposed between said first wall and said second wall.

14. The relay device for the RFID transponder of claim 1, wherein said first antenna, said second antenna, and said transmission line are formed at least partially from a pair of twisted wires.

15. The relay device for the RFID transponder of claim 1, wherein a length of said transmission line is adjustable.

16. The relay device for the RFID transponder of claim 1, further comprising a tuning circuit coupling said impedance adjusting circuit and said transmission line.

17. The relay device for the RFID transponder of claim 1, wherein said tuning circuit is a pair of twisted wires.

18. The relay device for the RFID transponder of claim 1, further comprising a squeeze-on connector configured to couple said impedance adjusting circuit and said transmission line.

19. The relay device for the RFID transponder of claim 1, wherein said impedance adjusting circuit is configured to provide a first impedance with said transmission line for a first input signal power and a second impedance with said transmission line for second input signal power.

20. The RFID container having the RFID tag of claim 19, wherein said first impedance is greater than said second impedance and said first input signal power is greater than said second input signal power.

21. A Radio Frequency Identification (RFID) object having an RFID transponder, comprising:

- a first antenna at a first location of the RFID object;
- a second antenna at a second location of the RFID object other than said first location;
- a transmission line coupling said first antenna and said second antenna; and
- an impedance adjusting circuit coupling the RFID transponder and said transmission media.

23. The RFID object having the RFID transponder of claim 22, wherein said object is formed of folded fiberboard parts.

24. The RFID object having the RFID transponder of claim 21, wherein said object is a pallet.

25. The RFID object having the RFID transponder of claim 21, further comprising a third antenna located at a third location other than said first location and said second location.

26. The RFID object having the RFID transponder of claim 25, wherein said third antenna is coupled to said transmission line.

27. The RFID object having the RFID transponder of claim 25, further comprising a fourth antenna located at a fourth location other than said first location, said second location, and said third location.

28. The RFID object having the RFID transponder of claim 27, further comprising a second transmission line coupling a third antenna and a fourth antenna.

29. The RFID object having the RFID transponder of claim 21, wherein at least one of said first antenna and said second antenna is a dipole antenna.

30. The RFID object having the RFID transponder of claim 21, wherein at least one of said first antenna and said second antenna is a loop antenna.

31. The RFID object having the RFID transponder of claim 21, wherein at least one of said first antenna and said second antenna is a spiral antenna.

32. The RFID object having the RFID transponder of claim 21, wherein said transmission line is a common resonant structure that is also configured to form at least one of said first antenna and said second antenna.

33. The RFID object having the RFID transponder of claim 21, wherein said container comprises:

a first wall;

a second wall; and

a rib interconnecting said first wall and said second wall.

34. The RFID object having the RFID transponder of claim 21, wherein said transmission line is interposed between said first wall and said second wall.

35. The RFID object having the RFID transponder of claim 21, wherein said first antenna, said second antenna, and said transmission line are formed at least partially from a pair of twisted wires.

36. The RFID object having the RFID transponder of claim 21, wherein a length of said transmission line is adjustable.

37. The RFID object having the RFID transponder of claim 21, further comprising a tuning circuit coupling said impedance adjusting circuit and said transmission line.

38. The RFID object having the RFID transponder of claim 21, wherein said tuning circuit is a pair of twisted wires.

39. The RFID object having the RFID transponder of claim 21, further comprising a squeeze-on connector configured to couple said impedance adjusting circuit and said transmission line.

40. The RFID object having the RFID transponder of claim 21, wherein said impedance adjusting circuit is configured to provide a first impedance with said transmission line for a first input signal power and a second impedance with said transmission line for second input signal power.

41. The RFID object having the RFID transponder of claim 40, wherein said first impedance is greater than said second impedance and said first input signal power is greater than said second input signal power.

42. A method of relaying a Radio Frequency Identification (RFID) signal, comprising the steps of:

receiving the RFID signal at a first antenna;

transmitting the RFID signal from said first antenna to a second antenna;

exhibiting a first impedance during said transmitting the RFID signal from said first antenna to said second antenna if said RFID signal has a first power; and

exhibiting a second impedance during said transmitting the RFID signal from said first antenna to said second antenna if RFID signal has a second power other than said first power.

43. The method of relaying the RFID signal of claim 42, wherein said first impedance is greater than said second impedance.

44. The method of relaying the RFID signal of claim 4, wherein said first power is greater than said second power.

45. The method of relaying the RFID signal of claim 3, wherein the RFID signal is a RFID interrogation signal.

46. A RFID container having a RFID transponder, comprising:

a plurality of container sides configured to at least partially surround content of the RFID container;

a first antenna associated with a first container side of said plurality of container sides;

a second antenna associated with a second container side of said plurality of container sides;

a transmission line coupling said first antenna and said second antenna; and

a matching circuit coupling said RFID transponder and said transmission line, said impedance adjusting circuit and said RFID transponder being arranged to present a first higher impedance to said transmission line for high signal power levels and a second lower impedance to said transmission for low signal power levels.